

AMERICAN FALLS FISH HATCHERY

ANNUAL REPORT

January 1, 1991 - December 31, 1991

Prepared by:

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INTRODUCTION

American Falls Hatchery is a resident fisheries hatchery located on the north bank of the Snake River one-half mile below the American Falls Reservoir Dam near the town of American Falls.

The primary objective of the hatchery is to rear for stocking and redistribution approximately 150,000 lbs of catchable-size (9-inch to 12-inch), and 20,000 to 30,000 lbs of fingerling (4-inch to 6-inch) rainbow trout Oncorhynchus mykiss.

Funding for the hatchery is from license monies and mitigation from the American Falls Reservoir District.

The physical layout of the hatchery consists of 20 single pass (100 x 8 x 3 ft) concrete raceways and a hatchery building containing 14 concrete primary rearing vats (21 x 4 x 2 ft).

Water for the facility is from Reuger Springs, located on the property, and averages 20 cfs at a constant temperature of 55°F.

FISH PRODUCTION

Five years of drought conditions, plus budgetary constraints, have again necessitated some rethinking and changes in production at American Falls Hatchery. We have cut catchable rainbow production to 300,000 fish and fingerling production to 100,000 fish in the last year. Another reason for cuts in production is to try to improve fin condition and overall fish condition. Due to the timing of egg availability from our egg source (Hayspur Hatchery), we often have to hold the fish off feed for several weeks in late winter and spring to alleviate overcrowding in the large raceways. As soon as we start to do this, we notice that fin condition deteriorates rapidly. We have been working with Hayspur Hatchery personnel to try and get later eggs so this will not be necessary in the future. Other methods tried, and to be tried, are changes in hatchery constants and feeding regimens so we will be able to feed continuously and not hold the fish off feed for extended periods.

For the last several years, we have raised exclusively Hayspur strain rainbow trout. These fish do very well at the hatchery, and recent studies have shown they return to the creel in greater numbers than other strains that we have produced in the past. See Tables 1, 2, and 3 for fish numbers, cost, egg numbers, sources, pounds, and transfers.

HATCHERY IMPROVEMENTS

- A. Repairs:
1. New metal roofs on old shop building and three car garage.
 2. Bedroom in basement of residence number three; built by hatchery personnel.
 3. Replacement of plastic bird screen on raceways with metal 2 X 2 inch poultry wire.
 4. Repairs on water chiller.
 5. Painted interiors of two residences and old shop building.
 6. Upgraded oxygen systems on one fish transport truck and replaced lettering on tank.
- B. Needs:
1. Metal siding on two residences and two garages.
 2. New metal roofs on two residences.
 3. Replacement mower deck for lawn tractor.
 4. New carpet in residence number three.
 5. Replacement wood burning stove in one residence.

FISH HEALTH

Fish health for the period was generally very good. We did not experience any outbreaks of viral or bacterial diseases during 1991.

All fry were started on TM medicated feed for the first two weeks of the feeding cycle. This seems to work at this station to control bacterial coldwater disease, and will be continued in the future.

All lots of fish were routinely tested twice yearly for IHNV, IPNV, BKD, and whirling disease with negative results.

I would recommend that we continue to start all fish on TM medicated feed.

FISH STOCKED AND TRANSFERRED

American Falls Hatchery stocks catchable and fingerling rainbow trout in three regions in southern Idaho. In addition, we transfer catchable rainbow

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trout to several different hatcheries and redistribution stations statewide. No major program changes were made during 1991. See Table 4 for numbers.

FISH FEED

During 1991, we fed 183,390 lbs of feed at American Falls with an overall feed conversion of 1.10.

Most of the feed was Rangen brand; however, we did conduct one feed comparison study between Rangen and Silver Cup brands to assess overall conversion, palatability, percentage of fines, fish condition, and cost comparisons. This study is included with this report. See Table 5 for breakdown of sizes, sources, and other study results.

PUBLIC RELATIONS

American Falls Hatchery generally receives approximately 5,000 visitors per year, mainly during the spring and summer months. This includes various school tours, scout groups, and the general public. We have had people from all over the United States and from several foreign countries. Most comments are very favorable and express amazement at the volume and clarity of the water. Several talks and slide presentations were given to various service groups including, Jaycees, Lions Club, and school groups. We had no major media contacts during the period, most of the comments about hatchery operations were given out at the regional level.

For the first time we participated in a Free Fishing Day clinic at the hatchery in conjunction with the American Falls Jaycees. Participants were limited to children up to age 14 and included various classes in regulations, fishing ethics, aquatic organisms, safety, how-to classes on fishing, and casting contests. All participants were required to register in advance and pay a small fee which covered the cost of lunch and prizes. In the afternoon we held the fishing portion of the program. All participants were allowed to catch and keep two fish from the upper unused ditch at the hatchery. Hatchery personnel were available to teach fishing techniques, assist in baiting hooks, and unsnarling lines, etc. Overall, it was a great success and we received many very positive comments from the parents who were asked to respond to a questionnaire at the end of the day. We will probably be doing this every year now unless major problems occur.

FIN CONDITION

We have attempted to improve fin condition at the hatchery by reducing numbers held over winter and different feeding techniques, with regard to densities and varying hatchery constants. We have not been into these programs

long enough to come to any definite conclusions as of this writing. More on this in next years report. Enclosed is some preliminary work done by Jay Barber during summer 1991.

SPECIAL PROJECTS

We participated in reward tagging fish for several streams in Region 5. The follow up work on this was done by regional personnel with very mixed results. The reason for the project was to determine stocking rates and locations for catchable rainbow trout in put-and-take streams in the region. We will be participating in catchable versus fingerling studies in some small reservoirs in the region in the coming season.

FIN QUALITY

Past policy at the American Falls Fish Hatchery has been to maximize fish production. High fish production was usually associated with high fish densities thus, leading to a substantial amount of fin erosion.

As sportsmen demand a quality product in the field, it is imperative to enhance the aesthetic characteristics of the hatchery fish that will be planted. A directive from Idaho Department of Fish and Game headquarters and cooperation from the regional fisheries managers have enabled this hatchery to reduce its annual production of fish and, thus, moderate rearing densities in the raceways.

Believing that lower fish densities will reduce fin erosion, fish samples were taken to assess present fin quality. Data from the present fin quality assessment can then be compared with future surveys.

Fish were sampled from two raceways representing separate egg lots. The pelvic, pectoral, and dorsal fins of each fish sampled were inspected for percent of fins present using the following rating system: 1-25% of fins present were given a rating of 1; 26-50% a rating of 2; 51-75% a rating of 3; 76-100% a rating of 4. The ratings were recorded, tallied, and averaged for each fin category, and they were combined and averaged to form a collective rating for each raceway sampled.

The collective ratings from the pelvic, pectoral, and dorsal fins for fish in raceways 10 and 7 were 2.2 and 2.0, respectively (see Table 6). This translates to slightly less than 50% fin erosion. In both raceways, the pelvic fin had the least erosion, while the dorsal fin had the most. It is the goal of this hatchery to reduce the collective fin loss to 25% (i.e., a rating near 3.0) by next year.

Fish will be monitored periodically in the upcoming growing season to assess what time periods the fish experience fin loss. For instance, when fish are

transported from the vats to the raceways, they will be inspected for fin loss. The fish will be sampled again every three months to gain insight whether the fin loss is a gradual process or occurs at certain stages of the development of the fish.

FEED COMPARISON REPORT

Abstract

A comparison of the performance of Rangen's 1/8-inch dry diet to Silver Cup's 1/8-inch dry diet in growing Hayspur strain rainbow trout at American Falls Fish Hatchery was undertaken during the period of August 1, 1991 through October 31, 1991. The fish fed Rangen's diet received 3,360 lbs of feed to produce 2,366 lbs of body weight for a conversion of 1.42 lbs of feed to lbs of body weight gained. Fish fed the Silver Cup diet received 3,152 lbs of feed and gained 2,048 lbs for a conversion of 1.54.

The result showed the two brands of feed do a comparable job of producing fish. Both groups of fish were comparably healthy at the conclusion of the study. Rangen's diet was recommended as the diet to be used at American Falls Fish Hatchery primarily because of its lower cost to produce a lb of fish. It costs \$0.43 to produce a lb of fish with the Silver Cup diet, while the cost per lb of fish with the Rangen diet was \$0.31.

Introduction

A feed comparison study was initiated on August 1, 1991 and continued through the months of September and October. The intent of the study was to compare the performance of Hayspur strain rainbow trout reared at American Falls Fish Hatchery on two different dry diets. The diets involved in the comparison were manufactured by Rangen, Inc. of Buhl, Idaho and Silver Cup Diet manufactured by Murray Elevators, Murray, Utah.

Objectives

The objective of this comparison study was to determine whether either of the two brands of fish feed would prove to grow rainbow trout at American Falls Fish Hatchery significantly better than the other brand of feed.

Methods

Rainbow trout from lot "91 May 1" had been inventoried and moved to the top 100 feet of raceways 7 and 9 on June 26, 1991. These fish were taken from the upper portion of raceway 10 to avoid any weak fish that may be at the lower end of the raceway and which might throw off our results.

At the commencement of the study, raceway 7 contained 32,459 fish at 24 fish/lb. Total weight was 1,342 lbs. The average length of the fish was 4.7 in and the density index using Piper's method was 0.14.

Raceway 9 contained 32,347 fish at 26 fish/lb. The total weight was 1,224 lbs, while the average length was 4.6 inches. The density index was 0.135.

Water flows were adjusted to 1.79 cfs through each raceway. Flows were more than adequate for the lbs of fish involved throughout the study. Water temperature at American Falls Fish Hatchery is a constant 55°F (12.8°C).

The fish in raceway 7 were fed Rangen's diet while the fish in raceway 9 were fed the Silver Cup diet. Sac feed was purchased from both supplies in 1/8-inch pellet size in 50-lb bags and fed throughout the study period.

The fish in both raceways were hand-fed four times daily for the month of August. This was done to ensure the feed was delivered adequately to the fish. The automatic feeders will not accurately handle small amounts of feed.

Feed rates had increased sufficiently by the first of September to allow use of the automatic feeders. The feeders were set for three feedings spaced throughout the day. During the period of October 28 through 31, the fish were hand-fed three times/day since the automatic feeds were freezing.

The fish were crowded down and pound-counted once/week during August and the first two weeks of September. Pound counts for the last half of the study were taken on the 15th and last days of the month. The pound counts were used to determine the average length of the fish from the U.S. Fish and Wildlife Manual of Fish Culture Appendix 4.0. The formula "Percent of body weight to be fed daily = H.C./L" from Piper et al. (1982) was used to determine feed rates. American Falls Hatchery traditionally uses an H.C. (hatchery constant) of 10. The symbol "L" stands for the average length of the fish. The "percent of body weight to be fed daily" is multiplied by the total body weight of fish in the raceway to obtain the total feed for the day. Prior to feeding, the fish feed is weighed each day.

Beginning September 15, both raceways were taken off feed one day/week for the remainder of the month. During October, both raceways were left off feed two days/week. This is done with almost all Hayspur strain fish raised at American Falls Hatchery to control growth. Since the Hayspur strain is an early-spawning rainbow trout, eyed eggs are received at American Falls hatchery during December, January, and February. Normal rearing practices would produce a larger catchable fish than is desired considering rearing space and hauling limitations.

The amount of fines in the feed was sampled by pouring 50 lbs of feed over an inclined screen. The fines filtered through the screen were collected and weighed. This weight was expressed as a percentage of the original 50 lbs of feed.

All raceways were cleaned daily by sweeping the entire (100 ft) raceway. Any mortalities were counted, removed, and recorded. Two 2-inch by 8-inch dam boards were installed at the end of the second raceway section to produce a settling area to give a visual method of observing and comparing the amount of settleable solids produced in each of the two raceways.

After the end of the comparison study, 50 fish from each raceway were examined for fin quality. A number from one to five was assigned to each fish for dorsal, pectoral, and pelvic fin quality, where 1 = no fins or almost no fins left, 2 = approximately 25% of fin left, 3 = approximately 50% of fin intact, 4 = approximately 75% fin retention, and 5 = nearly 100% of the fin or fins intact.

Ten fish were sacrificed from each raceway after the study to look at overall fish health. Total lengths were taken in millimeters and weights in grams. Eyes, gills, and pseudobranchs were looked at in the external part of the examination. These fish were also dissected to look at the amount of mesentery fat as well as some of the internal organs. Spleen color was noted, the hind gut was opened to look for inflammation; kidney, liver, and gall bladder conditions were also noted.

Results

The fish fed Rangen's diet (raceway #7) received 3,360 lbs of feed and gained 2,366 lbs of body weight during the study for a conversion of 1.42 lbs of feed to 1 lb of body weight. The fish fed Silver Cup diet received 3,152 lbs of feed and gained 2,048 lbs for a conversion of 1.54 lbs of feed to 1 lb of body weight.

Rangen's feed produced 3.5 oz of fines from a 50-lb bag of feed. This translated to 0.44% fines. The 50 lbs of Silver Cup feed produced 10.5 oz of fines for 1.3% fines.

The total mortalities for the Rangen's fed fish were 112 fish as compared to 90 fish for the Silver Cup fed fish. There was no noticeable difference in the amount of settleable solids accumulated from either of the raceways. Time spent cleaning the two raceways was comparable.

A comparison of dorsal fins showed the fish fed Rangen Diet to have retained 22.8% of this fin, while the Silver Cup group retained 43.5% of the dorsal fin. The fish fed Rangen Diet retained 66% of the pectoral and 61% of the pelvic fins. The Silver Cup fed fish retained 64% of the pectoral and 59% of the pelvic fins.

The Rangen fed fish weighed, on average, 0.33 g/mm, while the Silver Cup fed fish weighed an average of 0.31 g/mm at the end of the study.

Eyes, gills, and pseudobranches of all fish in both groups appeared normal. Mesenteric fat deposition was quantified by the following system: 0 was assigned for no mesenteric fat; 1 for slight fat, approximately 25%; 2 for approximately 50% fat; 3 for approximately 75% fat; and 4 for the mesenteries completely fat covered. The fish on Rangen's diet had an average fat score of 3.3. The Silver Cup fed fish scored an average of 3.0.

The spleens on all fish from each group were either black or very dark red, indicating a normal condition. One spleen in a Silver Cup diet fish appeared to be enlarged. The hind guts were opened to look for inflammation. Silver Cup fish showed no sign of inflammation, while two of the Rangen fed fish showed what appeared to be a slight inflammation of the hind gut. All fish showed good kidney condition, and all livers appeared normal. All Rangen fed fish had empty straw-colored gall bladders. Eight of the Silver Cup fed fish had empty gall bladders, while two had full gall bladders. All gall bladders were straw-colored.

Discussion

The fish on Rangen's diet had a better conversion at 1.42 lbs of feed/lb of gain than did the fish on Silver Cup at 1.54 lbs of feed to a lb of gain. The cost/lb of weight gain was \$0.31.4 with the Rangen diet, whereas the Silver Cup diet produced a lb of gain for \$0.43.1. The Silver Cup feed cost \$0.28 per lb, and the Rangen feed 21.75/lb.

The percentage of fines in both brands of feed was acceptable. There was no noticeable difference in the settleable solids produced by either feed. Mortalities for the period were considered normal for this size of fish at American Falls Fish Hatchery.

Fin retention was essentially equal for the two groups overall. Observation has shown that most fin erosion starts shortly after the time that feed was first withheld to control growth at this hatchery.

The Rangen fed fish were slightly heavier per millimeter than the Silver Cup fed fish. A larger sample size might have negated this small difference.

The autopsies showed both groups of fish to be quite healthy overall, other than for the aforementioned fin abrasion. Both groups had good amounts of stored body fat, which is beneficial while making the transition to a natural food supply after stocking.

The two companies' feed analyses, included on the feed sacks, showed both to *contain* not less than 40% crude protein and not more than 12% ash. Rangen's feed contained not more than 13% crude fat, while Silver Cup's lists not less than 10%. Rangen's fiber *content* is not more than 5%, while Silver Cup contains

not more than 3% fiber. Rangen's feed lists added minerals at not more than 2%, while Silver Cup lists sodium at 2% even.

Recommendations

This feed comparison showed both Rangen's dry 1/8-inch feed and Silver Cup's dry 1/8-inch feed to perform equally well overall. The conversion with Rangen's diet was better at 1.42 lbs of feed to produce a lb of body weight gain. Silver Cup diet converted at 1.54 lbs of feed to a lb of body weight gain.

Silver Cup's diet costs \$0.28/lb while Rangen's diet costs \$0.21.75/lb. This calculates to a cost of \$0.43 for a lb of fish produced by Silver Cup's diet, and \$0.31/lb of fish produced by Rangen's diet at American Falls Fish Hatchery. Thus, Rangen's diet would be the better feed to use at the American Falls Fish Hatchery by virtue of its being more cost effective than the Silver Cup diet.

ACKNOWLEDGEMENTS

The following people contributed to the program and this report:

Gary Baker Fish Hatchery Superintendent II

Dave Billman Fish Hatchery Superintendent I

Jay Barber Fish Culturist

Jim Riggin Fish Culturist

LITERATURE CITED

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Table 1. Production.

Species	Strain	Number	Pounds	Cost/lb	Cost/fish
Rb catchables	R9	779,006	180,971	.86	.21
Rb fingerling	R9	248,762	21,803	.86	.21
Totals		1,027,768	202,774		

Table 2. Eggs received.

Species	Strain	Number	Percentage hatch	swim-up
Rb	R9	718,200	80%	75%

Table 3. Source and destination.

Date	Species	Strain	Source	Number	Destination
12/11/90	Rb	R9	Hayspur	248,000	Region 5 reservoirs
2/6/991	Rb	R9	Hayspur	300,00	Statewide

Table 4. Fish stocked by region.

Region	Species	Strain	Number	Pounds
4	Rb	R9	16,060	5,501
5	Rb	R9	352,906	59,047
5	Rb	R1	70,699	2,200
6	Rb	R9	31,209	11,791
6	CC		520	6

Table 4a. Fish transferred.

Region	Species	Strain	Number	Pounds	Destination
1	Rb	R9	60,840	19,900	Clark Fork Hatchery
1	Rb	R9	17,993	6,664	Mullan Hatchery
3	Rb	R9	90,773	31,650	McCall Hatchery
6	Rb	R9	6,030	2,010	Ashton Hatchery

Table 5. Fish Feed

Size	Source	Pounds	Cost/lb	Total cost
Starter	Rangen	150	.39	58.50
#1 med.	Rangen	200	.52	104.00
1/32sm	Rangen	165	.655	108.08
3/64sm	Rangen	275	.625	171.88
1/16sm	Rangen	1,595	.59	941.05
3/32sm	Rangen	1,705	.56	954.80
3/32	Silver Cup	4,000	.28	1,120.00
3/32med.	Rangen	1,000	.4033	403.30
1/8blk.	Rangen	174,300	.2215	38,357.40
Totals		183,390		42,219.01

Table 6. Ratings for percentage of fins present of fish sampled in raceways 10 and 7 (rating 1+1-25% fin present; 2+26-50%; 3=51-75%; 4+76-100%).

Raceway sampled	Ratings for fins inspected			Collective average rating
	Pelvic	Pectoral		
10	2.8	2.1	.7	2.2
7	2.1	2.0	1.6	2.0

*Note: The number inspected for each raceway was 45 fish.